

# Adjacent Two-Level Lumbar Discectomy

## Outcome and SF-36 Functional Assessment

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**Study Design.** A retrospective outcomes study.

**Objectives.** To examine the outcome following adjacent two-level lumbar discectomy using both surgeon-based evaluation criteria and validated patient-based quality of life instrument (SF-36).

**Summary of Background Data.** Lumbar discectomies have documented success rates between 49% and 98% for single-level procedures. However, no prior study has specifically examined the outcome following adjacent two-level lumbar discectomy in a large series of patients.

**Methods.** This study analyzed 55 patients with a minimum 2-year follow-up. All patients underwent adjacent two-level lumbar discectomy for radicular pain attributable to nerve root impingement at the corresponding levels. The patients were divided into two diagnostic groups based on their preoperative radiographic studies. Patients with two-level adjacent posterolateral lumbar disc herniations without concomitant osseous degenerative changes at the same levels constituted Group 1 (22 patients). Patients with associated osseous degenerative changes at the same levels made up Group 2 (33 patients). The patients' clinical outcome was assessed using the MacNab classification and SF-36 questionnaire.

**Results.** The average duration of follow-up was 41 months (range 24–96 months). The group consisted of 35 males and 20 females with average age of 49 years (range 19–82 years). Excellent results were observed in 49%, good in 20%, fair in 15%, and poor in 16%. However, patients in Group 1 have 86% excellent/good results, whereas patients in Group 2 have 57% excellent/good results. Overall, 15% of the patients required reoperation and subsequent spinal fusion. Analysis of the SF-36 scores revealed significant differences based on patient's diagnostic grouping as well. Patients in Group 1 have physical and mental summary scores comparable with age- and sex-adjusted population norms and significantly higher than those in Group 2 ( $P < 0.01$ ).

**Conclusions.** Two-level discectomy is an effective treatment with clinical outcome comparable with single-level discectomy. Patients with posterolateral disc herniations and definitive radiculopathy without osseous degenerative changes at the same levels have better clinical outcome and quality of life scores compared with those patients having concomitant degenerative arthritis at the same levels. Patients having two-level discectomy may

be at increased risk of requiring subsequent lumbar fusion compared with those with single-level discectomy. [Key words: lumbar discectomy, herniated disc, radiculopathy, outcome, SF-36] **Spine 2004;29:E22–E27**

Lumbar discectomy is a common operation and numerous outcome studies are available in the literature. The reported success rate for lumbar discectomy ranges from 49% to 98%, depending on the duration of follow-up, the patient selection, and the clinical criteria used.<sup>1–13</sup> Most studies concur that early results of surgical discectomy are highly successful ( $>90\%$ )<sup>7</sup> but the results have been less positive with long-term follow-up.<sup>5,8</sup> Furthermore, most measures of outcome are based on subjective criteria such as patient's self-reported satisfaction, surgeon's rating of the success, or the need for second procedure.

Recent studies have emphasized clinical results based on patient-based outcome instruments such as the Short Form-36 (SF-36). The SF-36 is a standardized tool designed for evaluation of health status in all adult population.<sup>14,15</sup> Using the SF-36, several studies have demonstrated the improvement in the patient's quality of life following surgical intervention such as total joint arthroplasty,<sup>16</sup> rotator cuff repair,<sup>17</sup> and single-level lumbar microdiscectomy.<sup>7</sup> The SF-36 scores is also validated, therefore enabling comparisons between different clinical outcome studies.

To our knowledge, no study has specifically examined the clinical outcome following adjacent two-level lumbar discectomy. The goal of this article is to examine the outcome following this procedure using both surgeon-based evaluation criteria and a validated patient-based instrument (SF-36). In addition, variables that may affect the clinical outcome, as well as the correlation between the surgeon-based and patient-based evaluation criteria, are examined.

### ■ Methods

Sixty-three consecutive patients who underwent two-level adjacent lumbar discectomy from 1991 to 1997 at our institution were identified and retrospectively reviewed for this study. All patients had operations for radicular pain unresponsive to conservative therapy for a minimum of 6 weeks.

Preoperative investigation included standard lumbosacral radiographs. CT myelogram or MRI was also performed for all patients for diagnostic confirmation. Patient characteristics, including age, prior surgery, smoking status, and preoperative clinical symptoms and examination findings, were recorded.

All patients were seen approximately 2 weeks, 6 weeks, 10

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**Table 1. Background Data, Operative Level, and Revision Rate: All Patients and Breakdown by Diagnosis**

	All Patients	Diagnosis Group	
		Group 1 +HNP –Facet arthritis	Group 2 +HNP +Facet arthritis
Total number	55	22	33
Average age (range) (yr)	49 (19–82)	35 (19–69)	58 (26–82)
? Prior surgery	9 (16%)	2 (9%)	7 (21%)
Workers' compensation	5 (9%)	2 (9%)	3 (9%)
? Smoker	5 (9%)	2 (9%)	2 (6%)
Gender			
Male	35 (64%)	16 (73%)	19 (58%)
Female	20 (36%)	6 (27%)	14 (42%)
Surgery level			
L2–L4	4 (7%)	0	4 (12%)
L3–L5	14 (26%)	2 (9%)	12 (36%)
L4–S1	37 (67%)	20 (91%)	17 (52%)
Postoperative complications	4 (7%)	1 (5%)	3 (9%)
Requiring additional surgery	8 (15%)	3 (14%)	5 (15%)
Average time to reoperation (mo)	12	19	7
Average follow-up duration (mo)	41	45	40

HNP = herniated nucleus pulposus; Facet arthritis = osseous facet hypertrophy at the same level as disc herniation.

weeks, 6 months, and annually after surgery. Of the 63 patients, 55 patients had sufficient follow-up (minimum of 2 years after surgery) were included as the cohort of this study. From clinical notes and telephone interviews, the clinical outcome was assessed using the MacNab classification by an independent observer (E.C.S.). The outcome was described as excellent if the patient had complete pain relief and no residual neurologic deficit. Those with residual back and leg pain but not sufficiently severe to interfere with normal lifestyle were classified as good. Patients with a greater degree of pain or with significant neurologic symptoms or signs were classified as fair, and those with increasing pain or neurologic deficit were classified as poor. Patients who required additional lumbar surgeries at the same levels were considered “poor” even though most of them eventually had a successful outcome following additional decompressions and fusion.

In an attempt to validate these patients' clinical outcome, 31 of 55 patients also responded to the SF-36 quality of life questionnaire *via* telephone interview. Patients in this group were also asked to quantify their level of satisfaction with the surgical procedure. The remaining 24 patients could not be contacted. Statistical analysis for the SF-36 scores was performed using STATA software.

## ■ Results

Of the 55 total patients, 35 were men and 20 were women. Their age ranged from 19 to 82 years, with a mean of 49 years. Four patients had disc herniations at L2–L4, 14 patients had herniations at L3–L5, with the remaining 37 having herniations at L4–S1. Nine patients (16%) had previous lumbar discectomy. Five patients (9%) were involved in Workers' Compensation cases, and five (9%) were smokers.

The patients were divided into two diagnostic groups based on their preoperative radiographic studies (plain radiograph, CT scan, and MRI). Patients with isolated posterolateral lumbar disc herniations without coexisting osseous degenerative changes at the same levels constituted Group 1 (22 patients) while those with disc her-

niations and concomitant osseous degenerative changes (facet hypertrophy) at the same levels made up Group 2 (33 patients). Two of 33 patients in Group 2 had disc herniations with coexisting degenerative changes at one level and lacked degenerative changes in the adjacent level. The remaining 31 patients had disc herniations and coexisting degenerative changes at both levels. Because of the small number of this subgroup (2 patients), all 33 patients in Group 2 were analyzed together for this study. None of the patients in this study had isolated central disc herniation.

All patients presented with radicular pain ranging from 6 weeks to 36 months before surgery. Twenty-three patients (40%) had subjective sensation of peripheral numbness, and 28 patients (48%) had documented weakness on physical examination. Four patients (7%) had postoperative complications. One patient developed wound infection requiring oral antibiotics. The infection resolved without long-term consequence. Three patients had transient neurologic deficits that resolved spontaneously with conservative management. Nine patients (15%) required reoperation during the follow-up period for additional decompression and spinal fusion.

Table 1 demonstrates the cohort group's background information, operative levels, and follow-up duration according to the patients' underlying diagnostic group. The groups are comparable in all categories except that the patients with disc herniations without osseous degenerative changes (Group 1) were younger than those with coexisting osseous degenerative changes (Group 2).

The duration of follow-up ranged from 24 to 96 months with a mean of 41 months. The clinical outcome assessed by the independent observer is shown in Table 2. The results were further divided according to patients' diagnostic groups. Using the common convention of accepting the excellent and good categories of the MacNab classification as “success” and fair and poor as “fail-

**Table 2. Clinical Results of Two-Level Lumbar Discectomy Using MacNab Classification With 2-Year Minimum Follow-up: All Patients and Breakdown by Diagnosis**

Diagnosis Group	Total	Clinical Outcome			
		Excellent	Good	Fair	Poor
All patients	55	27	11	8	9
Group 1 (+HNP, no facet arthritis)	22	15	4	0	3
Group 2 (+HNP, +facet arthritis)	33	12	7	8	6

HNP = herniated nucleus pulposus; Facet arthritis = osseous facet hypertrophy at the same levels as disc herniation.

ures,” the clinical results are presented in Table 3. The overall success rate of two-level adjacent lumbar discectomy was 69%. However, patients in Group 1 had 86% success rate, while those in Group 2 had significantly lower success rate (58%,  $P < 0.036$ , Fisher exact test).

Of the 55 patients, 8 (15%) required subsequent lumbar surgeries for additional decompression and fusion an average of 12 months following index surgery (range 2–29 months). Six patients underwent posterior spinal fusion, 2 underwent combined anterior and posterior fusion, and 1 underwent isolated anterior fusion. The rates of reoperation were similar in both diagnostic groups (14% *vs.* 15%). Although all these patients were considered clinical failures for our present study because of the need for additional surgery, their outcome following revision surgery was analyzed (Table 4). All the patients in Group 1 and 4 of 5 patients in Group 2 can be considered “successful” by the MacNab classification in their most recent follow-up.

To validate the surgeon-based outcome of these patients, 31 patients responded to the SF-36 questionnaire *via* telephone interview. Background data (age, gender, underlying diagnosis, operative level, and duration of follow-up) in the 31 patients who responded to the questionnaire and the remainder 24 patients who could not be contacted are shown in Table 5. The responder group was slightly older, had higher proportion of females, and had higher revision rate compared with the nonresponder group. However, the underlying diagnoses and operative levels were similar in both groups. Numerous attempts to contact the nonresponders were unsuccessful.

To verify the correlation between SF-36 scores and clinical outcome by MacNab classification among the

**Table 3. Success Rate Following Two-Level Discectomy: All Patients and Breakdown by Diagnosis**

Diagnosis Group	Total	Success	Failure
All patients	55	38 (69%)	17 (31%)
Group 1 (+ HNP, no facet arthritis)	22	19 (86%)	3 (14%)
Group 2 (+ HNP, + facet arthritis)	33	19 (58%)	14 (42%)

HNP = herniated nucleus pulposus; Facet arthritis = osseous facet hypertrophy at the same levels as disc herniation.

**Table 4. Patient Outcome Following Revision Surgery: All Patients and Breakdown by Diagnosis**

Diagnosis Group	No. of Patients	Clinical Outcome Following Revision Surgery			
		Excellent	Good	Fair	Poor
All patients	8	2	5	1	0
Group 1	3	1	2	0	0
Group 2	5	1	3	1	0

responder group, the SF-36 scores from patients with excellent/good outcome were compared with those with fair/poor outcome. Table 6 demonstrates an excellent correlation between SF-36 scores and the MacNab classification. Those with excellent/good result have significantly higher SF-36 scores in all categories pertaining to physical wellness (physical function, role physical, body pain, vitality, and summary physical) compared with those with fair/poor result. The differences in these categories were statistically significant ( $P < 0.003$ ).

Analysis of the SF-36 scores revealed differences based on patient diagnosis. Patients with disc herniations without osseous degenerative changes (Group 1) have physical and mental summary scores comparable with the sex- and age-adjusted population norms and significantly higher than those with concomitant osseous arthritis at the same levels (Group 2). Table 7 shows the results for these patients' SF-36 scores according to underlying diagnosis. Domain averages that differ by 10 or more points are considered to represent significant differences in quality of life. Both physical and mental summary scores demonstrate statistically significant differences between these two groups ( $P < 0.01$ ).

Table 8 demonstrates that SF-36 scores also differ according to the presence of prior surgeries. Patients with prior discectomies tended to have lower quality of life

**Table 5. Background Data Between SF-36 Responders and Nonresponders**

	SF-36 Questionnaire	
	Responder (N = 31)	Nonresponder (N = 24)
Average age (range) (yr)	53 (22–80)	44 (19–81)
% with prior surgery	18	13
% Workers' compensation	3	16
% Smoker	10	4
Gender		
Male	16 (52%)	19 (79%)
Female	15 (48%)	5 (21%)
Diagnosis group		
Group 1 (+ HNP only)	11 (35%)	11 (46%)
Group 2 (+ HNP, + stenosis)	20 (65%)	13 (54%)
Surgery level		
L2–L4	2 (6%)	2 (8%)
L3–L5	9 (29%)	5 (21%)
L4–S1	20 (65%)	17 (71%)
% Requiring additional surgery	16	8
Average follow-up duration (mo)	44.7	37.1

**Table 6. Comparison of SF-36 Scores Based On Patients' MacNab Classification**

SF-36 Dimension	Excellent/Good (N = 18)	Fair/Poor (N = 13)	P (t test)
Physical function	77 (6)	42 (8)	0.0006
Role-physical	57 (10)	20 (7)	0.0034
Role-emotional	80 (9)	53 (12)	0.0366
Social function	78 (7)	45 (9)	0.0025
Body pain	68 (7)	30 (7)	0.0003
Mental health	72 (5)	62 (5)	0.0931
Vitality	60 (6)	31 (6)	0.0008
General health	62 (2)	55 (3)	0.0615
Summary physical	44 (2)	31 (3)	0.0001
Summary mental	50 (3)	43 (3)	0.0483

SEM = standard error of the mean (in parentheses).

scores compared with those without prior surgeries, although the differences were not statistically significant. Table 8 also shows that the need for additional surgery affected the SF-36 scores. Patients requiring additional surgeries had score differences >10 in 6 of 8 categories compared with those without additional surgery. The difference in the physical summary scores was statistically significant ( $P = 0.01$ ).

Although differences were found in the SF-36 scores according to patient's age and gender, they were not statistically significant and correlated with differences seen in the normal population. Smoking and Worker's Compensation also did not affect the SF-36 scores in these patients.

Because many prior outcome studies focused on patient's self-reported satisfaction, the 31 patients who responded to the SF-36 questionnaire were also asked to rank their level of satisfaction with the surgical procedure based on a 4-point scale (very satisfied, mostly satisfied, some reservation, and not satisfied). The results are shown in Table 9. The self-reported satisfaction of these patients corresponded with their MacNab classification (Table 1). Patients with isolated disc herniations without coexisting osseous degenerative changes, therefore, have better clinical outcome compared with those with associated osseous degenerative changes by three

**Table 7. SF-36 Scores by Diagnosis: Disc Herniation Only (Group 1) Versus Spinal Stenosis (Group 2) Compared With Standardized Population Norms**

SF-36 Dimension	Population Norms	Group 1 (N = 11)	Group 2 (N = 20)	P (t test)
Physical function	86	84 (14)	49 (33)	0.002
Role-physical	84	59 (45)	30 (35)	0.055
Role-emotional	81	91 (22)	53 (46)	0.017
Social function	83	81 (26)	54 (36)	0.042
Body pain	73	75 (27)	40 (33)	0.005
Mental health	76	79 (17)	60 (22)	0.019
Vitality	62	70 (21)	34 (23)	0.000
General health	72	62 (5)	57 (14)	0.217
Summary physical	49	45 (8)	34 (12)	0.010
Summary mental	51	54 (9)	43 (12)	0.012

SEM = standard error of the mean (in parentheses).

**Table 8. Comparison of SF-36 Scores by Presence of Prior Discectomy and Additional Lumbar Operations**

SF-36 Dimension	No Prior Surgery (N = 27)	Prior Surgery (N = 6)	P	No Additional Surgery (N = 26)	Additional Surgery (N = 7)	P
Physical function	66 (6)	38 (14)	0.06	67 (6)	39 (13)	0.04
Role-physical	44 (8)	25 (9)	0.32	65 (9)	76 (14)	0.1
Role-emotional	74 (7)	39 (20)	0.06	65 (9)	76 (14)	0.55
Social function	67 (7)	48 (15)	0.25	69 (7)	41 (14)	0.06
Bodily pain	55 (7)	33 (14)	0.17	56 (7)	30 (12)	0.07
Mental health	69 (4)	57 (12)	0.22	68 (4)	63 (7)	0.57
Vitality	50 (5)	29 (11)	0.09	50 (6)	32 (9)	0.13
General health	58 (2)	63 (5)	0.34	61 (2)	51 (5)	0.04
Physical summary	39 (2)	33 (4)	0.25	41 (2)	28 (5)	0.01
Mental summary	49 (2)	40 (6)	0.13	47 (3)	47 (4)	0.92

SEM = standard error of the mean (in parentheses).

different outcome measures: patient's self-assessment, surgeon-based MacNab classification, and SF-36 quality of life scores.

## ■ Discussion

The outcome studies of lumbar disc surgery document a success rate between 49% and 98% depending on the evaluation criteria used and duration of follow-up.<sup>1-13</sup> Most reports on lumbar discectomy show a tendency for outcome to deteriorate between short-term (several months postoperative) and long-term follow-ups.<sup>5,8,12</sup> Most studies used nonvalidated surgeon-based evaluation criteria, thus making comparison of clinical results difficult to interpret. Moreover, little information regarding the clinical outcome following adjacent two-level lumbar discectomy is available in the literature. Our study attempts to examine the outcome following two-level discectomy and assess outcome using both surgeon-based criteria and SF-36, a validated patient-based instrument.

Several prior studies suggest that patients with two-level lumbar discectomy have worse clinical outcome compared with those with single-level procedure. Wang *et al*<sup>18</sup> examined the outcome of 14 elite college athletes who had undergone lumbar disc surgery with a mean follow-up of 3.1 years. While 9 of 11 patients with single-level discectomy were able to return to their previous competitive sports, all the patients with two-level discectomy retired from sports because of continued low back symptoms. The authors speculated that the stresses incurred by removal of discs at two consecutive levels may

**Table 9. Patients' Self-Reported Satisfaction in the SF-36 Responders**

Satisfaction Level	Group 1 (N = 11) (%)	Group 2 (N = 20) (%)
Very satisfied	64	45
Mostly satisfied	36	30
Some reservation	0	15
Not satisfied	0	10



preclude these athletes from returning to strenuous competitive sports. Silvers *et al* retrospectively analyzed 60 elderly patients with microsurgical lumbar discectomy with a mean follow-up of 6.5 years.<sup>12</sup> While overall outcome was successful with 81% satisfaction rate and 68% of patients able to return to normal activities, those patients with multilevel procedures had worse long-term outcome compared with single-level cohorts.

In the present study, 55 patients who underwent two-level lumbar discectomy were assessed for their clinical outcome using the MacNab classification. The overall success rate (those with excellent/good results) for the entire cohort was 69%. Although this success rate appears lower than most reported series following lumbar discectomy with similar duration of follow-up,<sup>5,12</sup> this finding must be interpreted with caution. In our study, those patients requiring additional surgery were considered “failures” for the index procedure, although most had successful outcome following revision surgery (Table 4). If the eventual outcome is considered independent of the need for additional surgery, the success rate increases to 79% for the entire cohort and 100% for patients with isolated disc herniation without osseous degenerative changes (Group 1). Loupasis *et al*, in a review of 109 patients following lumbar discectomy, similarly classified patients with repeat surgery as having a poor result and found 64% excellent/good result with a 7- to 20-year follow-up.<sup>8</sup>

The 15% revision rate in this group appears higher than other reported series for single-level discectomy. Findlay *et al* detected only 6.1% repeat operation during 10-year follow-up for single-level lumbar discectomy,<sup>5</sup> and Loupasis *et al* reported a 7.3% reoperation rate 7 to 20 years following open discectomy.<sup>8</sup> Similarly, Junge *et al* described an 8.5% revision rate in their series. However, higher reoperation rates have also been reported in the literature.<sup>19</sup> Silvers *et al*, in their analysis of elderly patients (>60 years old) an average of 6.5 years following lumbar discectomy, detected a 20% revision rate.<sup>12</sup> Ebeling *et al* found a similar high rate of revision as well among his patients.<sup>20</sup>

Interestingly, the success rate following two-level discectomy differs depending on the patient's underlying diagnostic group. Those with isolated posterolateral disc herniations without coexistent osseous degenerative arthritis had 86% success rate, whereas those with associated arthritis had a significantly lower rate of 58% ( $P < 0.036$ ). This finding makes intuitive sense since the patients with degenerative facet hypertrophy likely have greater pathology and may require more extensive surgical decompression. Junge *et al* had similar findings in their prospective analysis of 164 patients undergoing lumbar spine surgery with a 2-year follow-up.<sup>19</sup> Patients with disc herniation only as the primary diagnosis had better outcome based on a modified Stauffer-Coventry scale compared with patients with disc herniation and “other relevant back diagnosis.” The “relevant back diagnosis” consists mostly of those with degenerative facet

disease. Gibson *et al*,<sup>21</sup> in a comprehensive review of randomized clinical trials on the outcome following surgical treatment for lumbar spine disease, also found improved outcome for patients with isolated disc herniation compared with those with spinal stenosis. Gibson *et al*<sup>21</sup> concluded that there is strong evidence supporting the effectiveness of discectomy for patients with sciatica caused by lumbar disc prolapse that fails to resolve with conservative management and surgical discectomy produces better clinical outcome than chemonucleolysis. However, they found no strong evidence of the efficacy of any form of decompression for spinal stenosis, based on a review of 10 randomized clinical trials for patients with degenerative spondylosis.<sup>21</sup>

Analysis of the SF-36 quality of life scores also confirmed that patients with isolated posterolateral disc herniation (Group 1) have better outcome compared with those with concomitant degenerative arthritis (Group 2). Indeed, the SF-36 scores in this subgroup are comparable with age- and sex-adjusted population norms (Table 7). Comparing the SF-36 scores from those with isolated disc prolapse (Group 1) and the normal population, similar scores (differences  $<10$ ) were seen in 7 of 8 categories as well as in physical and mental summary scores. However, significant differences were seen between patients in Group 1 and those with Group 2 in physical function, role-physical, role-emotional, social function, body pain, mental health, and vitality. The summary physical and mental scores significantly differ between the two groups as well ( $P = 0.01$ ).

One other study examined patient outcome following single-level lumbar discectomy using the SF-36.<sup>7</sup> The criteria for surgery included a history of sciatica with positive findings in an imaging and failure to improve with conservative measures.<sup>7</sup> The authors found that while preoperative SF-36 scores were significantly lower in the cohort group compared with population norms in physical function, role-physical, bodily pain, vitality, and social function. However, significant improvements were seen in these five categories 3 months following surgery. Indeed, patients achieved scores comparable with population norms in physical function, general health, vitality, social function, role-emotional, and mental health. Although the authors did not specifically mention the underlying diagnosis of these patients, one can extrapolate that the majority likely had isolated lumbar disc prolapse because of their young average age of 44 years. Their study therefore corroborates with our findings that lumbar discectomy can produce excellent patient function in a carefully selected group with appropriate diagnosis.

Several confounding factors must be considered in our conclusion that those with isolated disc herniation fare better than those with concomitant degenerative arthritis at the same levels. The percentage of patients with prior lumbar surgeries is twice as high in Group 2 compared with Group 1 (21% *vs.* 9%, Table 1). The average age of 58 years in Group 2 is significantly older than the average

of 35 years in Group 1 as well. These findings are consistent with the fact that patients in Group 2 already have osseous degenerative changes in their lumbar spine. Table 8 demonstrates the effect of prior surgery on the patient's SF-36 scores. Although those without prior surgery tend to have higher SF-36 scores compared with those with prior surgery, the differences were not statistically significant ( $P > 0.05$ ). Analysis of the effect of age and gender on the SF-36 scores also did not indicate significant differences beyond the expected variation within the population norm. Although Deyo *et al*<sup>4</sup> indicated higher complication and mortality rates associated with increasing age, several studies have shown that older patients have clinical outcome similar to the younger population.<sup>12</sup>

Those requiring additional surgeries, however, had significantly lower SF-36 scores in physical summary and physical function scores compared with those without additional surgery. This finding is consistent with most series in that clinical outcome tends to be less favorable following revision surgery.<sup>8,12</sup>

This is the first study that specifically examined the clinical outcome following adjacent two-level lumbar discectomy and attempted to use a validated questionnaire (SF-36) to correlate preoperative variables with clinical outcome. Our study suggests that overall success rate is comparable with single-level discectomy, although the rate of revision may be higher. In addition, patients with isolated disc herniations without associated facet arthropathy at the same levels tend to have the best outcome, with SF-36 scores comparable with the population norms. Patients with two-level disc herniations and degenerative facet hypertrophy have a less favorable prognosis. The presence of osseous degenerative changes, therefore, plays a crucial role in the expected clinical outcome following two-level adjacent lumbar discectomy.

### ■ Key Points

- This study assesses the clinical outcome following adjacent two-level lumbar discectomy using the MacNab classification and the SF-36 instrument.
- Fifty-five patients were divided into two groups based on their underlying diagnosis: those with disc herniations without osseous degenerative changes at the same levels (Group 1) and those with associated osseous degenerative changes (Group 2).
- Overall excellent/good results were seen in 69% of patients with 2-year minimum follow-up.

- Patients with disc herniations without coexistent osseous degenerative arthritis (Group 1) have better clinical outcome (86% excellent/good results) and higher SF-36 scores compared with those with associated osseous degenerative changes.
- Patients with two-level lumbar discectomy may have higher reoperation rates compared with those with surgery for single-level herniation.

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